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Co-creation of small-medium enterprises

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Abstract

People's lifestyles tend to change every time particularly for the role of product that they consume in changing people lifestyles. Variations in consumer choices are shifting the consumers' preferences from secondary to primary needs. Upon selecting products that will be consumed, consumers tend to choose items based on their preferences and cause the producers to fulfill the needs of their consumers. The process of fulfilling the consumers' needs is supported through co-creation process. Co-creation allows the product to be customized according to the consumer's expectations. The dimension of co-creation that are examined in this study are multiple channels, options, transaction, and relationship. The study empirically tests the instrument for multidimensionality, reliability & validity using a confirmatory factor analysis (CFA) approach. The instrument is further found to be reliable, and has convergent and discriminant validity. In order to examine the scale's external validity and generalizability, it is administered to samples of 300 business owners of small medium scale in Bandung City area.

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Keywords: co-creations; small medium enterprise; confirmatory factor analysis

1. Introducation

Today customer becomes more selective while consuming goods and services. They demand an exclusive product that fulfills their needs and wants. They want a product which exclusively differs them from others, so companies have to accommodate consumer wants in order to succeed in the market. Consumer demands goods that

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can be personalized based on their preferences. From that fact several producers start to realize that they have to adjust their marketing strategy with evolving trend. Tappe (2010:8) believed that marketing lives off the cohesion of research and innovation; because a company has to know its customers when it wants to successfully target them and in doing so gain a competitive advantage. Furthermore he (2010:19) expressed that as soon as the company has the opportunity to establish an ongoing dialogue with the consumer, it can also inquire about his interests and preferences regarding its marketing approach. So based on his statement (2010:8,19) to utilize this opportunity, producers apply a customized system which enable their customer to design their own product themselves with the company as a facilitator. Refer to co-creation strategy in marketing this customized strategy. Kaminski (2009:1) quoted Cherkoff and Moore's (2006) statement that defined co-creation as an energetic process, not an intellectual exercise. Coates (2009:4) also believed that co-creation is a new discipline that cannot be safely ignored by companies who want to succeed in today's marketplace. He (2009:4) added that technologies have created new modes of production and innovation that enable and encourage greater degrees of participation and collaboration. So based on Coates (2009:4) statement we can conclude that today's companies cannot act individually, because they need consumer participation to create value of the product.

In this background, the study aims to test an empirical model of co-creation dimension that could form the basis for a better understanding of the determinants of the construct. Therefore, the objectives of this paper are threefold: first, to identify the critical factors of co-creation dimension; second, to develop an instrument to measure co-creation based on the identified factors with a specific focus on the small medium scale enterprises in Bandung City area; and third, to empirically test the proposed instrument for multidimensionality, reliability and validity using a confirmatory factor analysis (CFA) approach. Confirmatory Factor Analysis allows the investigator to test the hypothesis that a relationship between a number of observed variables (survey items) and their underlying latent construct(s) exists. To test a scale for measuring co-creation this study named it as a CO-CREATION-SCALE; In subsequent sections of this paper, it explains the theoretical background of the study, describe the test of the conceptual model, and discuss the theoretical and managerial implications of the results.

2. Literature Review

Coates (2009:4) consideredfour main important issues, firstly, businesses in today's economy have to continuously reinvent themselves in order to adapt to increasingly complex and dynamic market realities. Secondly, standardization makes it difficult for companies to differentiate themselves from competitors. Thirdly, markets are more fragmented than they used to be; and consumers have unprecedented access to information and networks. Finally, at the same time technologies have created new modes of production and innovation that enable and encourage greater degrees of participation and collaboration. Prahalad and Rameswamy (2004:3), earlier have stated that the new value creation space is a competitive space centered on personalized co-creation experiences developed through purposeful interactions between the consumer and a network of companies and consumer communities. Tappe (2010:8), furthermore reinforced that a company has to know its customers when it wants to successfully target them and in doing so gain a competitive advantage. So in the new competitive space, the firm needs to know consumer to help them create value of product.

Table 1. Literature review of co-creation

Authors (years): purposes and findings
Prahald and Rameswamy (2004):
Co-creation as the way in which value is being created in consumer markets is undergoing a far-reaching and profound change. Instead of value being embedded in products and services, value is now derived primarily from the experiences of consumers. As result, value created by individual consumers interacting with a firm and its network of partners. They also express a four dimension of co-creation, namely multiple channels, options, transaction, and relationship.
Zwick, Bonsu and Darmondy (2008):
The discourse of value co-creation stands for a notion of modern corporate power that isno longer aimed at disciplining consumers and shaping actions according to a given norm, but at working with and through the freedom of the consumer.
Coates (2009):
Express that axioms support the emergence of co-creation as a new approach to innovation and customer involvement. Co-creation is hard to ignore because, under the right conditions, it helps companies build value and reduce risk, in areas including strategy, innovation and new product development.
Pater (2009):

To know more about co-creation and to describe four types of Co-creation, five Guiding Principles in Co-creation, and four areas of Value in Co-creation
Rameswamy (2009):
To describe that Firms must stop thinking of individuals as mere passive recipients of value, to whom they have traditionally delivered goods, services, and experiences. Instead, firms must seek to engage people as active co-creators of value everywhere in the system.
Kaminski (2009):
Express the principles of co-creation are evident in vital communities of practice, social groups, and expert teams where people come together to collaboratively create and share information,knowledge, and content beyond market exchange.
Tappe (2010):
Express Co-creation theory which is based on a thorough and continuous dialogue between companies and consumers appears to be the next logical step. It largely utilizes online communication tools and advocates the importance of companies listening to their customer's opinions and ideas. The dialogue is not tied to a certain field, but ranges from product development to marketing and distribution.
Frow, Payne and Storbacka (2011):
To develop a typology, not taxonomy of mutually exclusive and exhaustive setsof co-creation forms and to explorethe concept of co-creation, identify key forms of co-creation and to develop a conceptualframework for co-creation design.

Tappe (2010:9) quoted Prahalad and Rameswamy who articulated that globalization, deregulation, outsourcing and the convergence of industries and technologies are making it much harder for managers to differentiate their offerings. So co-creation is a new method that can help companies build their competitive advantage with consumer help. Rameswamy (2009:11)defined the term of co-creation as a process by which products, services, and experiences are developed jointly by companies and their stakeholders, opening up a whole new world of value. Whereas Pater (2009:2) defined co-creation as the practice of collaborative product or service development: developers and stake-holders working together. Based on preceding discussionit can be underlined that co-creation is collaboration with customer, who involve them as active participants in the value creation process.

Coates (2009:11) strengthened that consequently, it is not just the frequency of interaction, but the quality of the relationship that companies form with and facilitate among their customers, which will determine how knowledge is created, shared and transferred. Furthermore, Prahalad and Rameswamy(2004:4) stated that combining the building blocks of transparency, risk assessment, access and dialogue enables companies to better engage customers as collaborators and when companies combine the four building blocks in different ways, they create new and important capabilities. Whilst the aforementioned definitions of the concept of co-creation contain similar concepts, Prahalad and Rameswamy (2004:5) concluded that the concept ofco-creation can be distinguished by the dimension of multiple channels, options, transaction, and relationship in its implementation.

For the purpose of the study, after reviewing many co-creation literatures (as shown in Table 1), there is an extant study to examine and validate the construct of co-creation. Therefore, this study adopts Prahalad and Rameswamy's definition on each dimensions of the co-creation.

The following explains the definitions of each dimension of the co-creation investigated in this study. Multiple Channel (MP) is defined as the freedom of choice to interact with the firm. Options (OPT) are defined as several alternatives to fulfil consumer wants and needs. Transaction (TRA) is defined as interaction and transaction in their preferred language and style. Relationship (REL) is defined as associate choice with the experiences they are willing to pay for. Thus, the research question of the study is as follows: first, whether the co-creation in Bandung City area is determined by the dimensions multiple channels, options, transaction, and relationship. Second, whether the proposed model of co-creation is a valid measure. Based on the preceding discussion, the following hypotheses is investigated in this study: that there is a relationship between the dimensions of co-creation and their underlying latent constructs.

2.1. Equation

The study used the AVE (Average Variance Extracted) and the CR (Construct Reliability) to get the result of validity and reliabity of each item that used in this research. Said, Badru & Sahid (2011:1099) stated that the construct validity is determined by the average value AVE (Average Variance Extracted) using the following formula:

$$AVE = \frac{Sum\ of\ Standardize\ Loading\ Square}{Sum\ of\ Standardize\ Loading\ Square + Measurement\ error}$$

Furthermore Said et al (2011:1099) express that construct Reliability (CR) is intended to determine the consistency of construct validity indicator. Construct Reliability was calculated using thefollowing formula:

$$CR = \frac{Square\ of\ Standardize\ Loading}{Square\ of\ Standardize\ Loading + Measurement\ error} \quad [2]$$

**Measurement error = 1-(Standardized Loading)^2*

3. Method

3.1. Samples

Data was collected from small-medium scale business owners in the Bandung City area. The sampling procedure used for the study was convenience sampling. The total of 300 business owners have been randomly selected, almost 300 samples valid for data analysis, representing a response rate of 100 percent. Bernard (2000) suggests that a valid response rate for face-to-face surveys, as were used here, is approximately 80 per cent.

The respondents wereapproached personally and the survey was explained in detail (including its purpose, the meaning of the items and what is expected of the respondents). Questionnaires were distributed to the respondents and they were asked to give their answer on a five-point Likert scale (ranging from 1, indicating very strongly disagree to 5, indicating strongly disagree). The high response rate is due to the personal-contact approach used during the survey and after completing the surveys the respondents were given small gifts.

3.2. Model Testing

After the model is specified, this study applies a confirmatory factor analysis (CFA) as an analytical tool for co-creation model validity. As stated by Curran, Finch and West (1996:16), CFA requires the investigator to specify both the number of factors and the specific pattern of loadings of each of themeasured variables on the underlying set of factors. Thus it is more appropriate to use a CFA as this study has specified the model that contains several dimensions to be tested (i.e. co-creation that contains four dimensions). Furthermore, Suhr (1999:1) stated that confirmatory factor analysis (CFA) is a statistical technique used to verify the factor structure of a set of observed variables". CFA allows the researcher to test the hypothesis that a relationship between the observed variables and their underlying latent construct(s) exists (Suhr 1999:1).

CFA is used to measure and give a confirmation of the theory. CFA measurement theory specify how measured variables representing the constructs contained in the theoretical model, where researchers already know in advance the number of factors in the model, and the linkages between factors. The study applied construct validity as one of the most important validity when evaluating a research measure. Suhr (1999:1) states that "The researcher uses knowledge of the theory, empirical research, or both, postulates the relationship pattern a priori and then tests the hypothesis statistically."

This study also used criteria of model fit in CFA that commonly performed such as Chi-square (x^2) and its associated probability/p-value which should not be statistically significant if there is a good model fit (Gallagher et al, 2008:265). Furthermore Suhr (1999:1) stated that "The chi-square test indicates the amount of difference between expected and observed covariance matrices".

This study considers GFI, AGFI, TLI, and RMSEA as measurement of model fit that commonly performed. The Goodness-of-fit (GFI) and Adjusted Goodness-of-fit (AGFI) indices are also Absolute Fit Indices-with 0.85 considered acceptable. Lievens and Anseel (2004:301) quoted Medsker, Williams, and Holahan, (1994). "the goodness-of-fit index (GFI) as well as incremental fit statistics such as the comparative fit index (CFI) and the root mean square error of approximation(RMSEA) were used. For both GFI and CFI, values > .95 constitute good fit and values> .90 acceptable fit".

Furthermore Lievens and Anseel (2004:301) quoted Browne &Cudeck (1992) "For the RMSEA, it has been suggested that values < .05 constitute good fit, values in the .05 to .08 range acceptable fit, values in the .08 to.10

range marginal fit, and values > .10 poor fit" Standardized Factor Loadings should exceed 0.50 and ideally be above 0.70, with statistical significance, in order to demonstrate high convergence on a common point (Hair at Gallagher et al, 2008:267).

This study examines the efficiency of the proposed model by testing a measurement model and the overall model. In the first step, it tests the measurement model using the assessment of the second-order factor model. To establish construct validity, it examines: (a) the relationship between the observable indicators (items) and their latent constructs (four-dimensions), and (b) correlations among the dimensions. The second step is to test the overall model. The results of the structural model test determine the relationship between the four-dimensions and the variable. If the data of the Root Mean Square of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Goodness-of-fit Index (GFI), Normed Fit Index (NFI), and Adjusted Goodness-of-fit Index (AGFI) estimates are statistically significant in the structural equation model, then the evidence indicates that the full model of co-creation is valid.

This study is categorized as a second-order category; the first derivative is the dimension, followed by item (see Table 3). The measurement model was first assessed to confirm that the scales were multidimensional and reliable. Further analysis utilizes the structural equation modelling (SEM) techniques using the SPSS ver 20.0 and the Analysis of Moment Structure (AMOS) program ver 20.0. SEM techniques are useful to determine the effectiveness of the model and the proposed hypotheses. In specifying the SEM model, the conceptualization of the model can be described as a second-order factor model. The result of first measurement model showed that none of item was dropped.

The results of CFA are presented in Table 3. Cronbach's coefficient alpha estimates for the four dimensions of co-creation ranged between 0.59 and 0.84, exceeding 0.60 minimum values. The study applied the standardized factor loadings and average variance extracted (AVE) of each construct to verify the convergent validity. For each construct, the standardized factor loading was above 0.5 and the AVE was higher than the 0.5.

4. Results and Discussions

4.1. Descriptive statistics

Demographic data were also collected, to allow the researcher to obtain a deeper understanding of the participants' responses. As shown in Table 2 the descriptive statistics of the sample are summarized.

Table.2. Descriptive statistics of the respondents to the survey

Measure	Options	f	%
Gender	Male	242	80%
	Female	58	20%
Age	<20	53	18%
	21-35	87	29%
	36-45	138	46%
	>46	22	7%
Marital status	Married	204	68%
	Not Married	96	32%
Range of income per month	<IDR 1.000.000	15	6%
	IDR 1.000.001-IDR 5.000.000	23	8%
	IDR 5.000.001-IDR 10.000.000	127	42%
	IDR 10.000.001-IDR 15.000.000	86	29%
	IDR15.000.001-IDR 20.000.000	36	12%
	> IDR 20.000.001	28	9%
Type of product produced	Leather Shoes	93	31%
	Clothing	135	45%
	Accecories	8	2,7%
	Food and Beverage	64	31,3%

Majority of the business owners studied were male (80%), it showed that male dominated the business in the small medium scale. It shows that 46 percent of the business owners were between 36-45 years old. However,the study found attractive figures, that the majority of the respondents were business owner between the ages of 36-45 years old. These figure reflected the growing trend of the high percentage of small-medium enterprises of young age. Majority of the respondents' marital status were married (68 percents). The respondents were also diverse in range of income per month (or total monthly cash flow of their business). Majority of the respondents (42%) could generate total monthly cash flow from their business around IDR 5.000.001-IDR 10.000.000.

The study classifies the business owners' intofour categories as follows: producer of leather shoes, clothing, accesories and food and beverages. Majority of the respondents were producers of clothings (45 percents). It could be argued that Bandung City has been well known for its superiority in producing fashion goods such as clothing by small medium enterprises. The figures were followed by the producers of food and beverages (31 percents).

4.2. Scale development

A survey instrument consisting of 12 items is developed in the present study. The instrument is extended for current study using a thorough review of literature. The developed instrument has been examined based on the comments and suggestions from experts (academicians, researchers and practitioners) so as to effectively address all the aspects of co-creation. The instrument is also developed with specific reference to small-medium enterprise industry. Results of the pretest items revealed minor instances of ambiguous wording (which were subsequently changed) and confirmed the expected completion time for the questionnaire.

Table 3. Dimensions and items of the study

Dimension (first order)	Items (second order)	Std. Factor Loadings
Multiple Channel (MC) CR = 0.642, AVE = 0.351	**Flexibility in Conducting Direct Interaction (X11)** : My company's product creation process generated through interactive discussion with consumers directly	0,59
	Flexibility in Conducting Indirect Interaction (X12):My company's product creation process generated through interactive discussion with consumers indirectly through communication media such as the telephone according with the consumer's wants.	0,65
	Flexibility in Conducting Interaction Through On-Line Media (X13) : My company's product creation process generated through interactive discussion with consumers through online media such as email, chat, and other social media in accordance with the consumer wants.	0,63
Options (OPT) CR = 0.733 AVE = 0.579	**Product Design Options (X21)**: My company's product creation process generated through interactive discussion with consumers by offering several options of product design	0,52
	Material Product Options (X22): My company's product creation process generated through interactive discussion with consumers by offering the freedom to choose the model and materials that they want	0,72
	Price Alternative (X23): My company's product creation process generated through interactive discussion with consumers by offering alternative prices according to selected materials that they wants	0,82
Transaction (TRANS) CR = 0.781 AVE = 0.664	**Exchange Ideas With Consumers (X31)**: My company's product creation process generated through interactive discussion with consumers by way of communicating with consumers	0,84
	Timeliness of Order Completion (X32) : My company's product creation process generated through interactive discussion with consumers by completing order according to time that specified by consumers.	0,74
	Comfortable Atmosphere (X33):My company's product creation process generated through interactive discussion with consumers in order to create a comfortable atmosphere for consumers.	0,62
Relationship (REL) CR = 0.760 AVE = 0.626	**Final Pricing (X41)** My company's product creation process generated through interactive discussion with consumers so the final price of the product according to standards of consumer	0,59
	Creating an Enjoyable Experience (X42): My company's product creation process generated through interactive discussion with consumers so there was a pleasant experience	0,85
	Creating Shared Value (X43): My company's product creation process generated through interactive discussion with consumers in order to the process of value creation with customers	0,69

In order to validate empirically the CO-CREATIONSCALE, this study adopted scale development that was performed based on the suggestions of Churchill (1979).Churchill's concept has been adopted by many scholars in

marketing as one of the most comprehensive steps for scale development(Rufaidah 2006, 2012). Churchill outlines eight basic steps for developing self-report measures of marketing constructs. However, this study combines the first seven steps proposed by Churchill to develop the required scales. These steps are: specify domain of construct, generate a sample of items, questionnaire scaling and questionnaire development, collect data, assess the reliability, and assess validity. The instrument is generated from four dimensions of the co-creation variable, each dimension contained three items. Then, the study was conducted to test them and to examine the dimensionality of co-creation.

Table 4. Parameter estimates for structural model

Relationships	Parameter estimates	S.E	CR
Multiple Channel (MC) – Co Creation	1.000		
Options (OPT) – Co Creation	1.100	.193	5.706**
Transaction (TRANS) – Co Creation	1.651	.251	6.585**
Relationship (REL) – Co Creation	1.074	.187	5.740**

*Note. Dashes indicate that the factors are fixed at 1.0; Parameter estimates were found in standardized regression weight; C.R. = critical ratios were found in unstandardized regression weight. ** p< 0.05.*

The significant relationship between the four dimensions and the overall co-creation variable further supports the convergent validity of the scale (Table 4). Overall, all four pairs of squared correlations are smaller than the shared variance of the respective constructs. The significant relationship between the four dimensions and the overall co-creation variable further supports the convergent validity of the scale (Table 4). Overall, all four pairs of squared correlations are smaller than the shared variance of the respective constructs. Discriminant validity is established if the shared variance is larger than the squared correlations between constructs.

Table 5. Correlations between the four dimensions of the model

Dimensions	MC	OPT	TRANS	REL
Multiple Channel (MC)	0.594			
Options (OPT)	-0.027***	0.793		
Transaction (TRANS)	-0.032***	-0.121***	0.376	
Relationship (REL)	-0.015***	-0.061***	0.028**	0.66

*Note. The shared numbers on the diagonal are the square roots of the average varianceextracted. * p < 0.1, ** p < 0.05, *** p < 0.01*

The results for the measurement model results are shown in Table 5. Therefore, the data recommend that strong evidence of construct validity and reliability exists for the scale of co-creation in a Small-Medium Enterprises industry.

Table 6. The results of the model tests

	X^2	df	X^2/df	RMSEA	SRMR
Default model	212.968	50	4.259***	.104	.057
Independent model	1403.055	66	21.258***	.260	.303
Recommended value			<5	<0.08	≤0.08
	TLI	CFI	GFI	NFI	AGFI
Default model	.839	.878	.894	.848	.835
Independent model	.000	.000	0.395	.000	.285
Recommended value	>0.9	>0.9	>0.9	>0.9	≥0.8

*Note. ***p < 0.00.*

In Table 6, the overall fit of the measurement models is found to be adequate. The Chi-square/df ratios (4.259) are lower than the 5.0. The root mean square error of approximation (RMSEA) value (0.104) is higher than 0.08, indicating poor fit (Browne and Cudeck (1992) quoted by Lievens and Anseel (2004:301). The standardized root mean residual (SRMR) value (0.057) is equivalent to or less than the recommended value of 0.08.In addition, some indices of the TLI, CFI, GFI, and NFI estimates are lower than the recommended 0.90. Furthermore, the AGFI (0.835) exceeds the recommended level of 0.8, indicating acceptable fit (Zikmund, 2003).

The result of the first measurement model showed that all dimension to measure the variable of co-creation are valid and all items to measure their respective dimensions are valid with average loading factor above 0.5. The first measurement model has improved its model fit criteria through GFI of 0.894 and AGFI of 0.835. These score

criteria are in the category of marginal fit. The AGFI (0.835) exceeds the recommended level of 0.8, indicating acceptable fit (Zikmund, 2003). However, the value of the TLI of 0.839 has not fulfilled the fit criteria as this score should be greater than 0.9. The value of the RMSEA of 0.104 indicates poor fit but fails to fulfill the fit criteria, as the construct validity and reliability exists for the scale of co-creation in a small-medium enterprises industry.

Although the measurement of model is a valid model, the model has not fulfilled a model fit. It could be argued that the time to implement the surveycould become one of the main factors to be considered in collecting the data as most business owners are busy with their daily operation. This situation could reduce the focus of the respondents to complete the survey.

However,this study has generally satisfied the main objective of the study to test the construct validity. This study has executed the testing of dimensions of co-creation or CO-CREATION-SCALE; it has proven that a confirmatory measurement of co-creation concept is significantly valid. More specifically, a multi-item measure of co-creation by investigating its equivalence across subject of small-medium enterprisesinBandung City are as proven valid. The study of the measurement model, shows that all dimensions are valid in measuring the research variable (co-creation) and all items are valid in measuring the dimension (multiple channel, options, transaction, and relationship). Still, the study recommends increasing the minimum loading factor of the item to 0.6 in order to achieve an improvement in the value of the model fit. Several items should be dropped from the model if this alternative is chosen. As quoted by Gallagher et al (2008:267) from Hair et al. (2006) that Standardised Factor Loadings should exceed 0.50 and ideally be above 0.70, with statistical significance, in order to demonstrate high convergence on a common point. Since the present study has filled the gap in the literature of measuring the co-creation construct, particularly in providing the first scale to measure the concept of co-creation, it could be justified that the present scale (CO-CREATION-SCALE) is as acceptable.

5. Conclusion

This study aims to examine the empirical dimensions of co-creation's construct. Where the results of the study shows that all of the items of the construct co-creation of four dimensions and twelve indicators have loading factor above 0.5 which is a valid criteria for an item, this model has not fully met *Fit* index, where RMSEA of 0.104 that exceeds criteria fit that is between 0.08-0.09. Whereas the criteria fit can be found at GFI and AGFI which meet the criteria of *marginal fit* where its value between 0.8-0.9. Models that do not fit can be influenced by many external factors such as the respondents, the research, the number of respondents, and objectiveness of the respondents in answering a variety of questions in the questionnaire.

The main purpose of this study has been achieved; to test co-creation scace for multidimensional, reliability and validity using confirmatory factor analysis (CFA). However, this study has limitations, because the research is only performed in one place or city. Thus, the study recommends that further research could use a larger sample and be applied in various categories of the small medium enterprises in other parts of the world. Further researcher also could expand the object and scope of the research. The study of the measurement model of the second-order category shows that all items are valid in measuring the dimensions (multiple channels, options, transaction, and relationship). In other word, the items are valid in measuring dimensions and the dimensions are valid in measuring the research variable (co-creation).The study has proven that this CO-CREATION SCALE is an established measurement for examining the co-creation process. The results from the study indicate that using confirmatory factor analysis approach to test the model validity that is conducted through SEM is an essential way for this study. The paper contributes to study about the component of co-creation by strengthening the concept of a multidimensional co-creation model.

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